

# The Skeleton Keys of Turf Reinforcement

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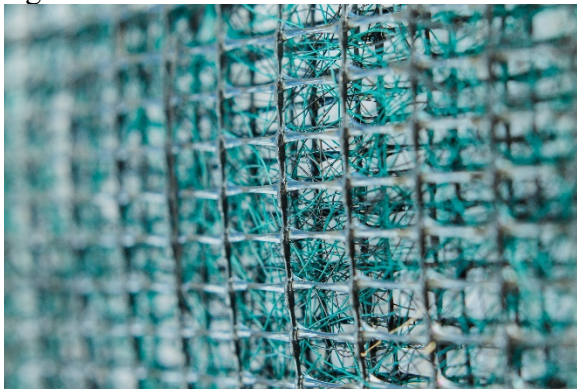
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Every project has its skeletons and every project has a key. New Zealand Transportation Authority knows as much about unique challenges as anyone. Two interesting projects come to mind: one is the stretch of SH 23 between Hamilton and Raglan, classified as a high-risk rural road and the other involves stabilizing an embankment that is part of the historic Katikati Cemetery.

As a designer you must consider a number of factors. How far back do we cut to provide better sightlines? How much space do we have to work with? Will there be limitations on equipment due to space constraints? How steep will the final designed slope be? Do we want hard armored or a vegetated slope?

For both projects a turf reinforcement mat was selected to stabilize the embankments. What is a turf reinforcement mat (TRM)? The Erosion Control Technology Council (ECTC) defines a TRM as “A rolled erosion control product composed of non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements processed into a permanent, three-dimensional matrix of sufficient thickness”.

For the SH 23 project, a stitched TRM along with 300 mm HD steel pins was chosen. This TRM is made up of two polypropylene nets with a polypropylene matrix (ECP-2). The final design for the slope showed a 25 m high and 60 m long cut face to shave back a corner to improve the sight lines.

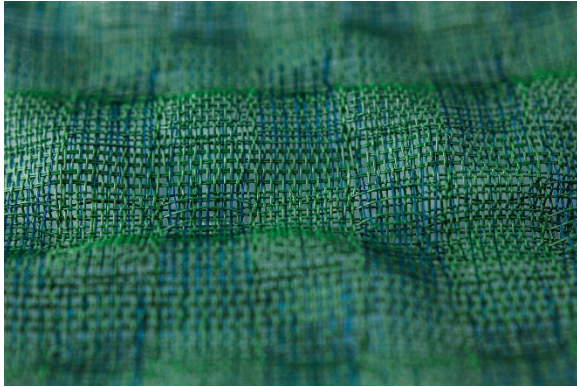


Stitched TRM



Installed TRM (prior to vegetation)

For the Katikati Cemetery project a woven, high performance TRM (T-Recs) along with percussion driven earth anchors was selected since the work zone was limited and it was already unstable. After the grade changes were made, the contractor was able to install the HPTRM without using heavy equipment to preserve the gravesites at the top of the slope. The UV stabilized, HPTRM provided an aesthetically pleasing finish and met the environmental needs of the project



Woven HPTRM



Installed HPTRM (prior to vegetation)

Why go with a soft armor solution rather than a traditional hard armor solution? Turf Reinforcement Mats actually withstand higher velocities than your standard Rip Rap. They also provide a more natural, pleasing aesthetic, which was very important to the Katikati Cemetery project in particular. Choosing a vegetated slope over hard armoring will also help reduce the “heat island effect” which can be helpful in areas that might be close to a stream with endangered species. Studies have also shown that it is more economical to use TRMs over rip rap or a concrete lining. Turf reinforcement mats can also be installed using smaller equipment which is extremely helpful to limited construction zones.

The end result was a safer, aesthetically pleasing landscape for both projects. State Highway 23 was much safer and taken off the “high risk” list. Visitors to the cemetery in Katikati are content to see a lovely final resting place for their loved ones. The contractors were satisfied at how quickly the turf reinforcement mats on their respective projects were installed and vegetated.